

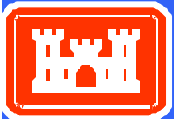
# ***Public Information Workshops***

## ***Proposed 2001 Willamette Reservoir Operations***

***April 24, 2001 - Eugene***

***April 25, 2001 - Sweet Home***

***April 26, 2001 - Stayton***



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# ***Meeting Overview***

- ✍ Introductions & Meeting Review*
- ✍ Proposed 2001 Operating Plan*
- ✍ Current River and Reservoir Conditions*
- ✍ River & Reservoir Forecasts*
- ✍ Special Considerations*
  - ✍ Flow Requirements for Endangered Species - NMFS*
  - ✍ Reservoir Operations and Oregon Water Rights - OWRD*



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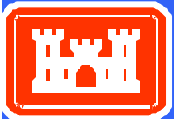
# ***Meeting Overview***

## *✍ Special Considerations (continued)*

- ✍ Reservoir Operations and Water Quality - ODEQ*
- ✍ NW Power Emergency and what it means for Willamette Projects - BPA*
- ✍ Water Conservation Measures in an Extreme Low Water Year*

## *✍ Questions/Discussions*

## *✍ Adjourn*



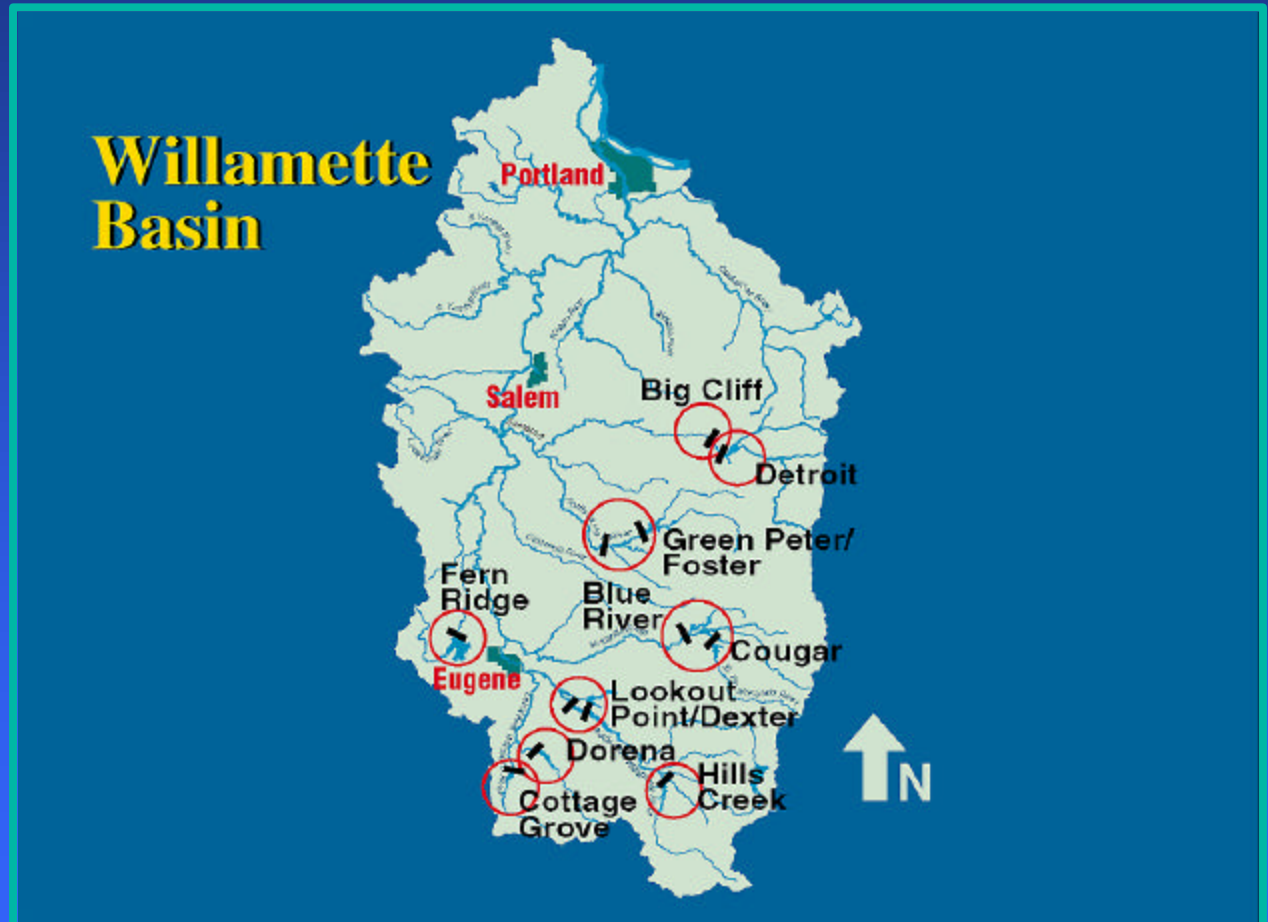
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# ***Willamette Basin Project, Oregon***

**13 Dams and Reservoirs**  
- 11 multiple-purpose  
- 2 reregulating

**Over 100 Miles of Bank  
Protection works**

**Navigation Channel,  
Mouth to Corvallis (135  
miles)**



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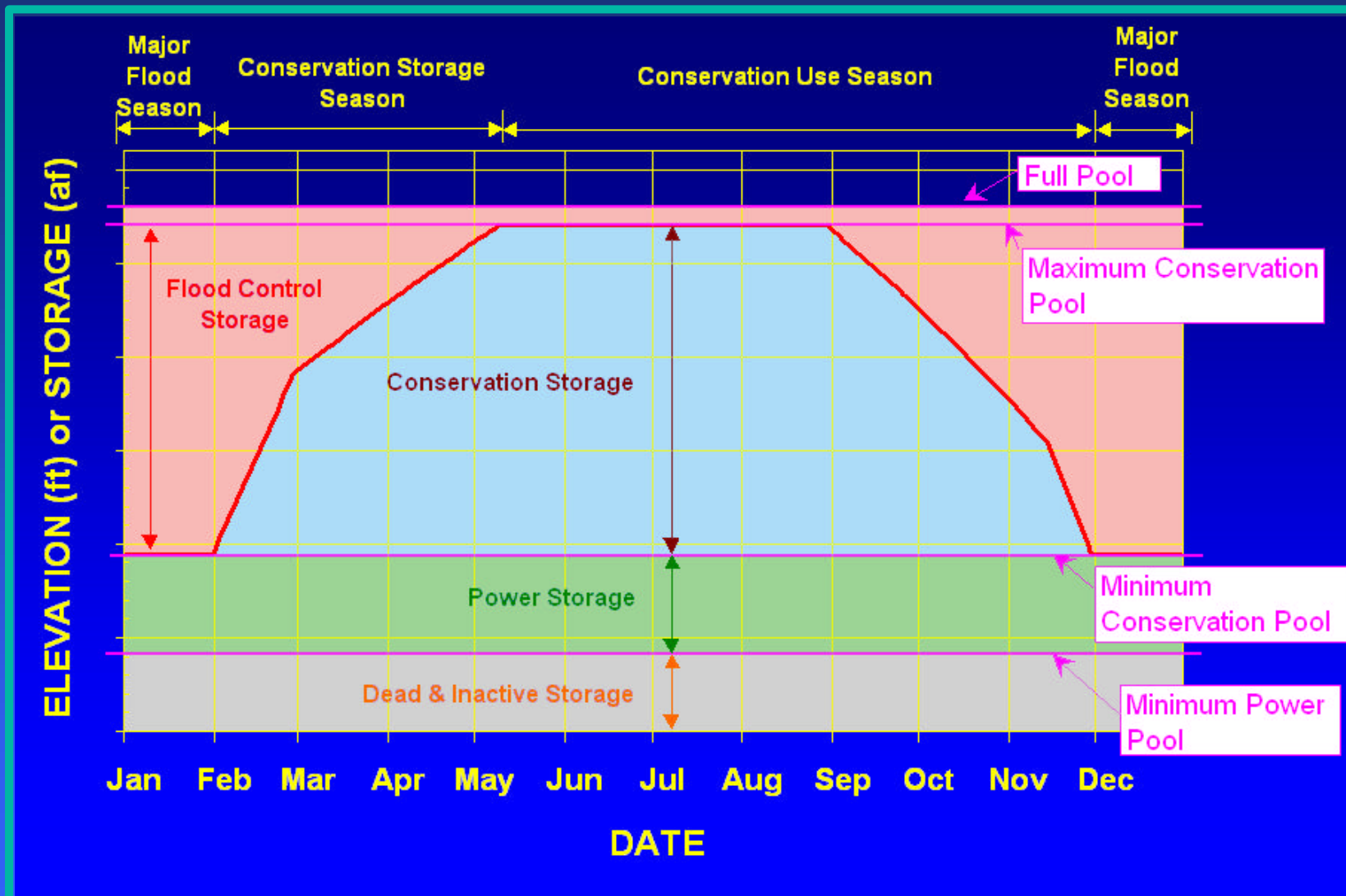
# *Authorized Purposes*

- ~~✗~~ Flood Control*
- ~~✗~~ Fish & Wildlife*
- ~~✗~~ Hydropower*
- ~~✗~~ Irrigation*
- ~~✗~~ Municipal & Industrial*
- ~~✗~~ Navigation*
- ~~✗~~ Recreation*
- ~~✗~~ Water Quality*



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# Multi-Purpose Reservoir Water Control Diagram

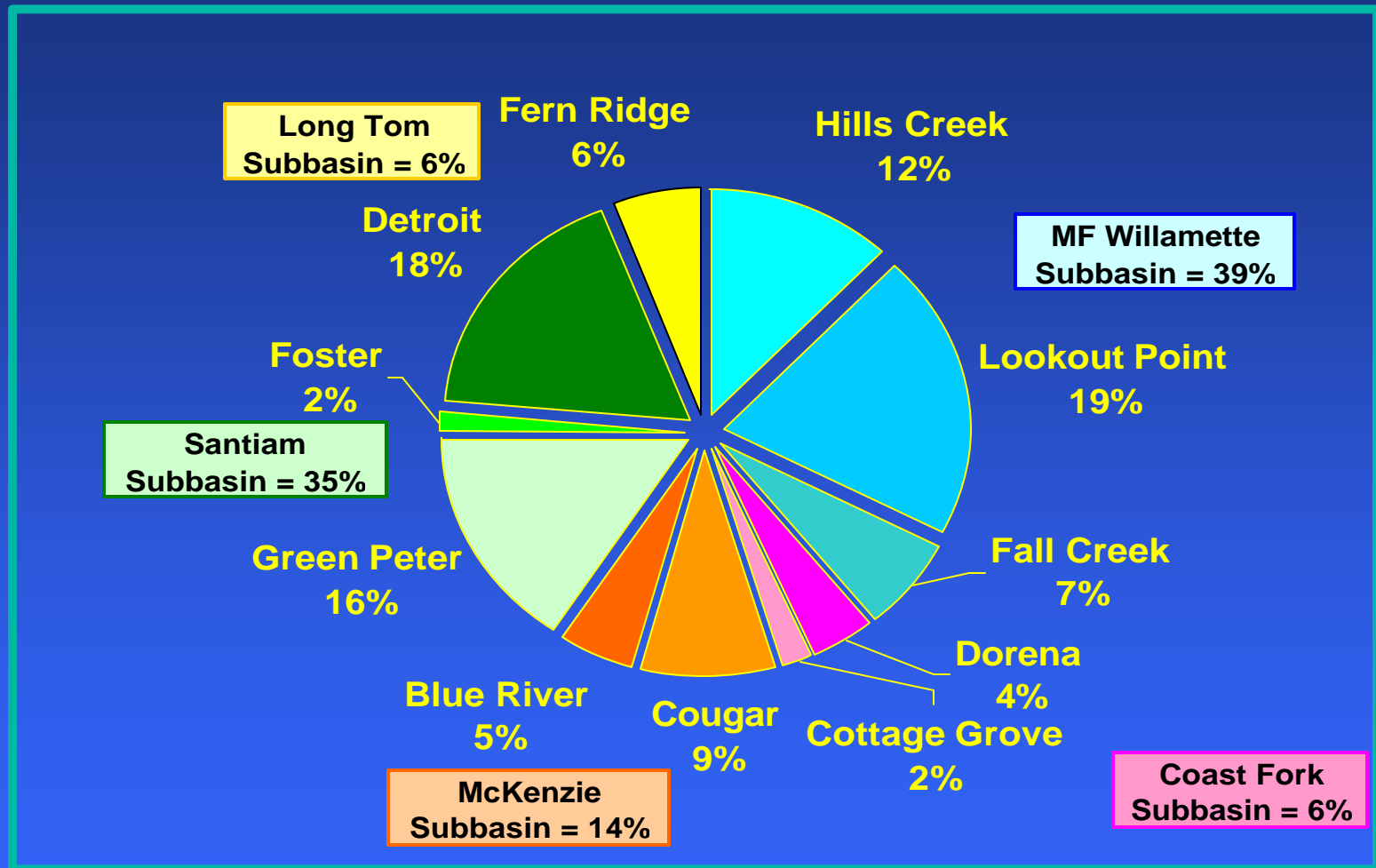


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# ***Willamette Conservation Storage***

***Total = 1.6 million Acre-feet***



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# ***Willamette Projects Proposed 2001 Operating Plan***

- ✍ Coordination Efforts*
- ✍ Special Considerations*
  - ✍ Extreme low water conditions*
  - ✍ Endangered species*
  - ✍ Water quality*
  - ✍ NW hydropower emergency*
  - ✍ Irrigation needs*
  - ✍ Recreation*
- ✍ Proposed Operating Criteria*



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# ***Coordination Efforts***

## *Endangered Species Act, Section 7 Consultation*

* NMFS*

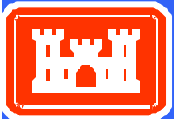
* USFWS*

## *Other Federal Agencies*

* USFS:            National Forest land management*

* BPA:             Hydropower*

* BuRec:          Irrigation Contracts*



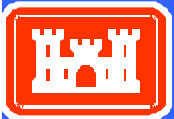
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# ***Coordination Efforts***

## ***State Agencies***

-  *Water Resources Department*
-  *Department of Fish & Wildlife*
-  *Department of Environmental Quality*
-  *Department of Agriculture*
-  *State Marine Board*
-  *State Parks*

## ***Governor's Office***

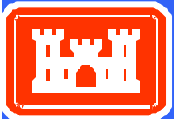


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# ***Special Considerations***

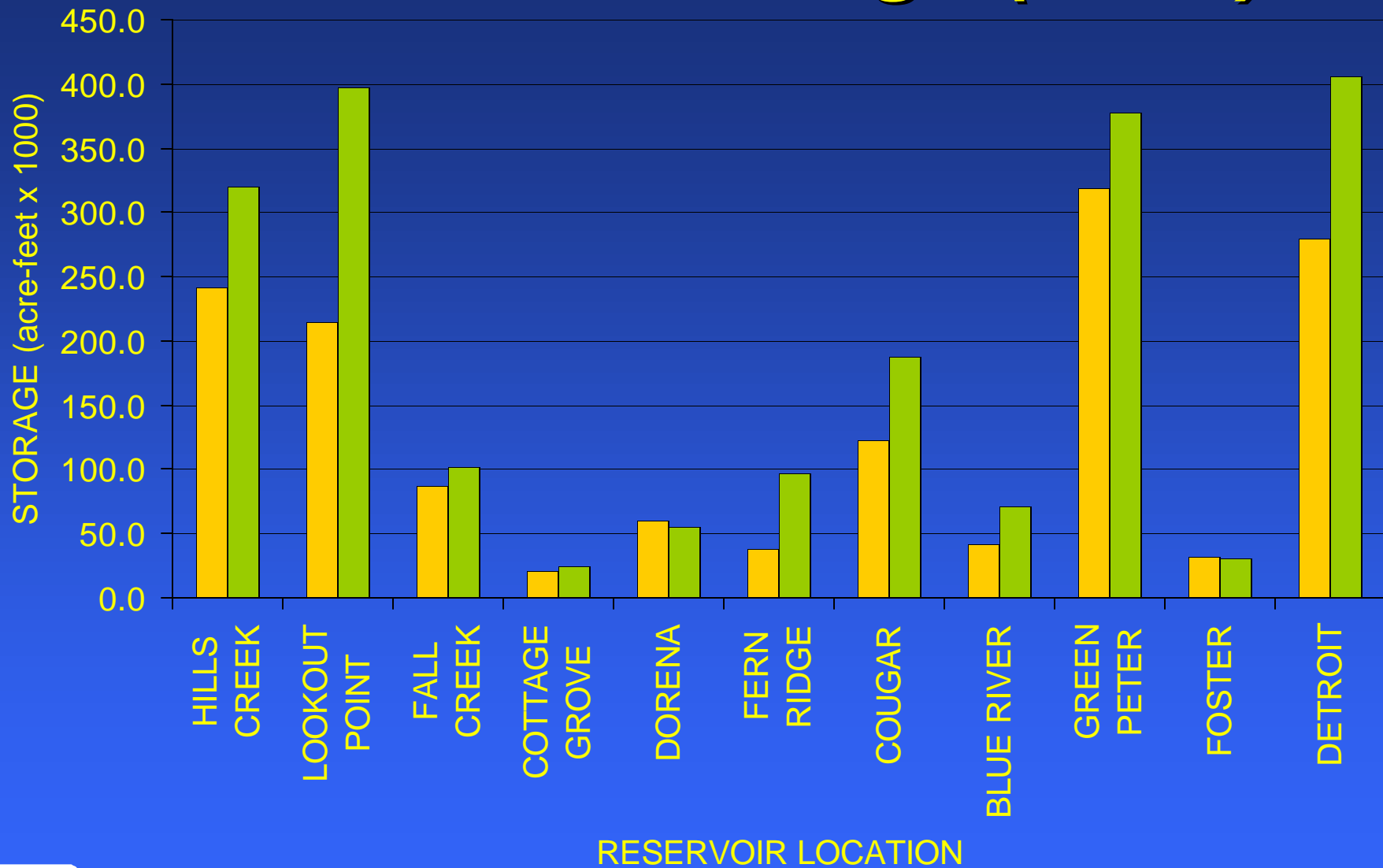
## ***Extreme Low Water conditions***

- ✍ 2001 is the Second Driest Year on Record through 1 April*
- ✍ Precipitation: 58% of normal*
- ✍ Snowpack: 66% of normal*
- ✍ Reservoirs storage:*
  - ✍ 62 % of rule curve*
  - ✍ 38 % Below the Rule Curve (Equates to 610,000 acre-feet)*
  - ✍ Total storage available for flow augmentation above Minimum Conservation Pool is 750,000 acre-feet*
- ✍ The driest year, 1977, followed with an above normal wet spring and summer - especially May*
- ✍ Need 8 inches in May to catch up to 3rd worst year*



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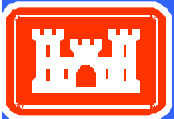
# Current Storage (2001)



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# ***Special Considerations Endangered Species***

- ~~Spring Chinook~~*
- ~~Winter Steelhead~~*
- ~~Bull Trout~~*
- ~~Oregon Chub~~*



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# ***Special Considerations Endangered Species***

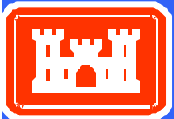
## *✍ Spring & Early Summer Fish Flow Targets*

- ✍ Initiated in 1999*

- ✍ Required to Support Juvenile Steelhead and Adult Chinook Migration*

- ✍ Studies by ODFW Show Increased Survival Under Higher Spring Flows*

- ✍ Requested by NMFS in Their Draft Biological Opinion*





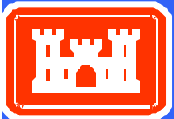
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# ***Special Considerations Endangered Species***

## *Oregon Chub Measures*

-  Cannot maintain Lookout Point Lake at full until July 15*
-  Middle Fork minimum flows from Dexter Dam maintained at 1100 cfs*



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# ***Special Considerations***

## ***Water Quality Concerns***

- ✍ Reservoir flow augmentation is absolutely critical for public health and safety*
  - ✍ Adequate dilution is required to assimilate pollutants and meet State standards*
  - ✍ Summer augmented flows are approximately 200% of historic unregulated flows*
- ✍ DEQ has requested discharge permittees to minimize impact of wastewater discharge*



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# *Special Considerations*

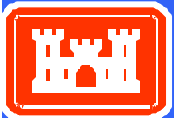
## *Water Quality Concerns*

### *✍ Summer-Fall Mainstem Flow Augmentation Targets*

*✍ DEQ accepted reduced Salem and Albany flow targets*

### *✍ Coast Fork Willamette River*

*✍ Maintain adequate storage in Dorena & Cottage Grove lakes to ensure minimum flow releases through summer and fall*



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# ***Special Considerations Pacific Northwest Power Emergency***

- ✍ BPA Declared Regional Power Emergency*
  - ✍ Insufficient water to meet power needs and other activities-including fish spill*
  - ✍ Maximize power generation capacity at all hydro-power plants--including Willamette*
  - ✍ Request to maintain full power pools at Willamette Projects until October*



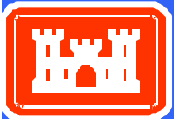
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# ***Special Considerations Irrigation Needs***

## ***✎ Existing Irrigation Contracts***

- ✎ 240 existing contracts, mostly for small amounts***
  - ✎ Fully contracted amount: 57,000 acre feet***
  - ✎ Most on Long Tom River: 25,000 acre feet***
  - ✎ Base contracts acreage may be substantially less***
- ✎ Most contracted storage met in minimum streamflow releases from dams***
- ✎ We expect to be able to honor existing contracts***

## ***✎ Currently No Municipal and Industrial Contracts***



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# ***Special Considerations Recreation***

## *✂ Normal Operations*

- ✂ Recreation is a high priority purpose of the Willamette Reservoirs*
- ✂ Fern Ridge, Foster and Detroit filled and held as long as possible through summer*
- ✂ Low priority recreation lakes (Lookout Point) drawn down first to meet water needs*



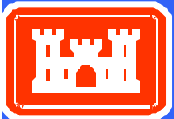
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# ***Special Considerations Recreation***

## *✂ Extreme Dry Conditions*

- ✂ Reservoir storage approximately 60% of normal*
- ✂ Inadequate water available to fully meet all needs*
- ✂ Recreation a lower priority than endangered species, water quality, hydropower and irrigation*
- ✂ Storage from large reservoirs critical to meeting needs*

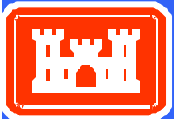


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# ***Special Considerations Recreation***

## *✍ Extreme Dry Conditions*





- ✍ Detroit, Green Peter and Fern Ridge lakes will not fill*
- ✍ Foster, Dexter and Dorena lakes will fill or will be close to it*



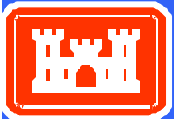
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# ***Proposed 2001 Operating Plan***

## *April 2001 Interim Guidelines*

-  Maintain absolute minimum of 13,000 cfs*
-  Match natural system inflows up to 20,500 cfs*
-  Store system inflows above 20,500 cfs*
-  Reservoir storage inadequate to continue as of April 15*

## *Mid-April to October Operating Plan*



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# ***Proposed 2001 Operating Plan***

## *✂ Operating Criteria*

### *✂ Mainstem Flow Augmentation @ Albany and Salem*

*✂ April - June salmon & steelhead targets*

*✂ July - October water quality targets*

### *✂ Minimum Tributary Instream Flows*

### *✂ Interim Draft Limits*

### *✂ Drawdown Priorities*

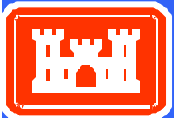


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# ***Proposed 2001 Operating Plan Spring - Early Summer Salmon & Steelhead Targets (at Salem)***

<u><i>Period</i></u>	<u><i>ESA flow Thresholds*</i></u>	<u><i>Planned Flow Targets</i></u>
<i>Apr 1 - Apr 15</i>	<i>20,500 cfs</i>	<i>13,000 - 20,500 cfs</i>
<i>Apr 16 - Apr 30</i>	<i>17,800 cfs</i>	<i>15,000 cfs</i>
<i>May 1 - May 31</i>	<i>15,000 cfs</i>	<i>15,000 cfs</i>
<i>June 1 - June 15</i>	<i>13,000 cfs</i>	<i>5,000 cfs</i>
<i>June 16 - June 30</i>	<i>8,700 cfs</i>	<i>5,000 cfs</i>

***\* Per NMFS draft Biological Opinion***



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# ***Proposed 2001 Operating Plan Summer - Fall Flow Augmentation Targets @ Albany***

<u><i>Period</i></u>	<u><i>Normal Target</i></u>	<u><i>Planned 2001 Target</i></u>
<i>July</i>	<i>4,500 cfs</i>	<i>4,000 cfs</i>
<i>August 1-15</i>	<i>5,000 cfs</i>	<i>4,000 cfs</i>
<i>August 16-30</i>	<i>5,000 cfs</i>	<i>4,000 cfs</i>
<i>September</i>	<i>5,000 cfs</i>	<i>4,000 cfs</i>
<i>October</i>	<i>n/a</i>	<i>4,000 cfs</i>

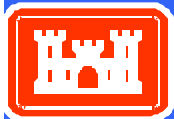


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# ***Proposed 2001 Operating Plan Summer - Fall Flow Augmentation Targets @ Salem***

<u><i>Period</i></u>	<u><i>Normal Target</i></u>	<u><i>Planned 2001 Target</i></u>
<i>July</i>	<i>6,000 cfs</i>	<i>5,000 cfs</i>
<i>August 1-15</i>	<i>6,000 cfs</i>	<i>5,000 cfs</i>
<i>August 16-30</i>	<i>6,500 cfs</i>	<i>5,000 cfs</i>
<i>September</i>	<i>7,000 cfs</i>	<i>5,000 cfs</i>
<i>October</i>	<i>n/a</i>	<i>5,000 cfs</i>



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# ***Proposed 2001 Operating Plan***

## *✂ Operating Criteria*

### *✂ Mainstem Flow Augmentation @ Albany and Salem*

*✂ April - June salmon & steelhead targets*

*✂ July - October water quality targets*

### *✂ Minimum Tributary Instream Flows*

### *✂ Interim Draft Limits*

### *✂ Drawdown Priorities*



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# ***Proposed 2001 Operating Plan Minimum Tributary Flows for Fish, Water Quality & Recreation***

***(June - October, cfs)***

<del>✓</del> Hills Creek	400 <b>(300)</b>	<del>✓</del> Blue River	50
<del>✓</del> Lookout Point	1,000 <b>(1,100)</b>	<del>✓</del> Fern Ridge	30-50
<del>✓</del> Fall Creek	30-150	<del>✓</del> Green Peter	50
<del>✓</del> Cottage Grove	50	<del>✓</del> Foster	800-650
<del>✓</del> Dorena	100	<del>✓</del> Detroit	1000 <b>(900)</b>
<del>✓</del> Cougar	400 <b>(300)</b>		



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# ***Proposed 2001 Operating Plan***

## *Operating Criteria*

### *Mainstem Flow Augmentation @ Albany and Salem*

* April - June salmon & steelhead targets*

* July - October water quality targets*

### *Minimum Tributary Instream Flows*

### ***Interim Draft Limits***




### *Drawdown Priorities*

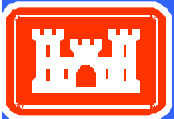


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# ***Proposed 2001 Operating Plan Interim Draft Limits***

## *What is an interim draft limit ?*

-  Guideline for the amount of storage needed in the reservoirs to meet all flow requirement through September*
-  Represents the minimum elevation that a reservoir can go on to at particular time to and still have enough water saved for later use*
-  Raises a “red flag” that we need to adjust flows or face later shortages*



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# ***Proposed 2001 Operating Plan Interim Draft Limits***

## *✍ Purpose & Objectives of interim draft limits*

- ✍ Balance water available for fish in early season with later season requirements*
- ✍ Estimate the amount of water in storage available to meet spring fish flow targets*
- ✍ Ensure adequate storage to meet:*
  - ✍ Minimum project outflows*
  - ✍ Mainstem flow augmentation targets at Albany and Salem*
  - ✍ Regional power needs through fall*



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# ***Proposed 2001 Operating Plan***

## *Operating Criteria*

### *Mainstem Flow Augmentation @ Albany and Salem*

* April - June salmon & steelhead targets*

* July - October water quality targets*

### *Minimum Tributary Instream Flows*

### *Water for Out-of-Stream Needs*

### *Interim Draft Limits*

### *Drawdown Priorities*



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# ***Proposed 2001 Operating Plan Reservoir Drawdown Priorities***

*(April -October)*

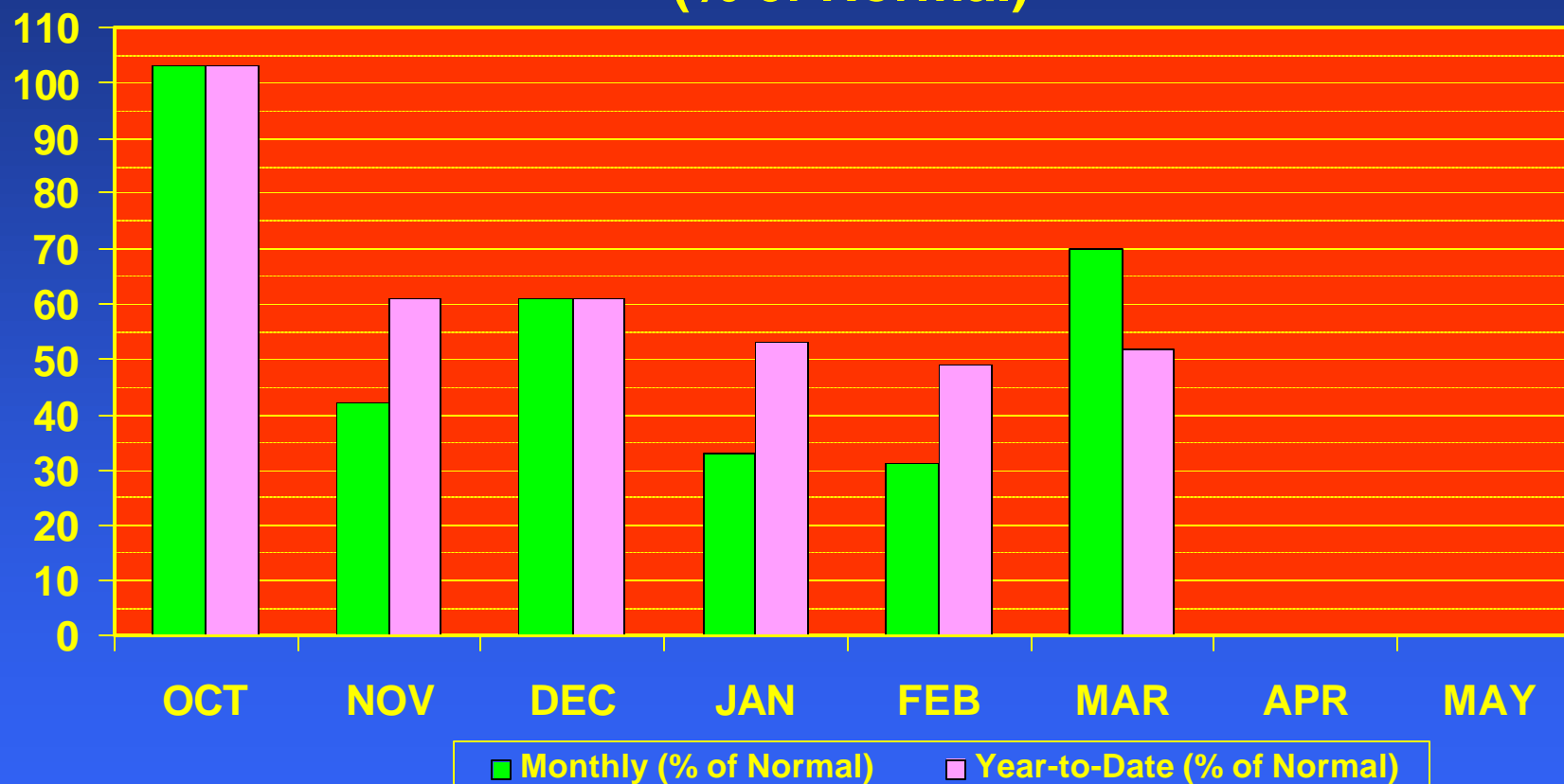
<u><b>Priority</b></u>	<u><b>Normal Year</b></u>	<u><b>2001 (to date)</b></u>
<b><i>First:</i></b>	Lookout Point	Detroit
<b><i>Second:</i></b>	Cougar	Green Peter
<b><i>Third:</i></b>	Blue River	Blue River
<b><i>Fourth:</i></b>	Hills Creek	Lookout Point
<b><i>Fifth:</i></b>	Fall Creek, Cottage Grove, Dorena, Green Peter	Hills Creek, Cougar Fall Creek, Dorena, Cottage Grove
<b><i>Last:</i></b>	Fern Ridge, Foster, Detroit	Fern Ridge, Foster



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# Current Hydrologic Conditions

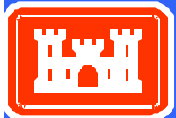
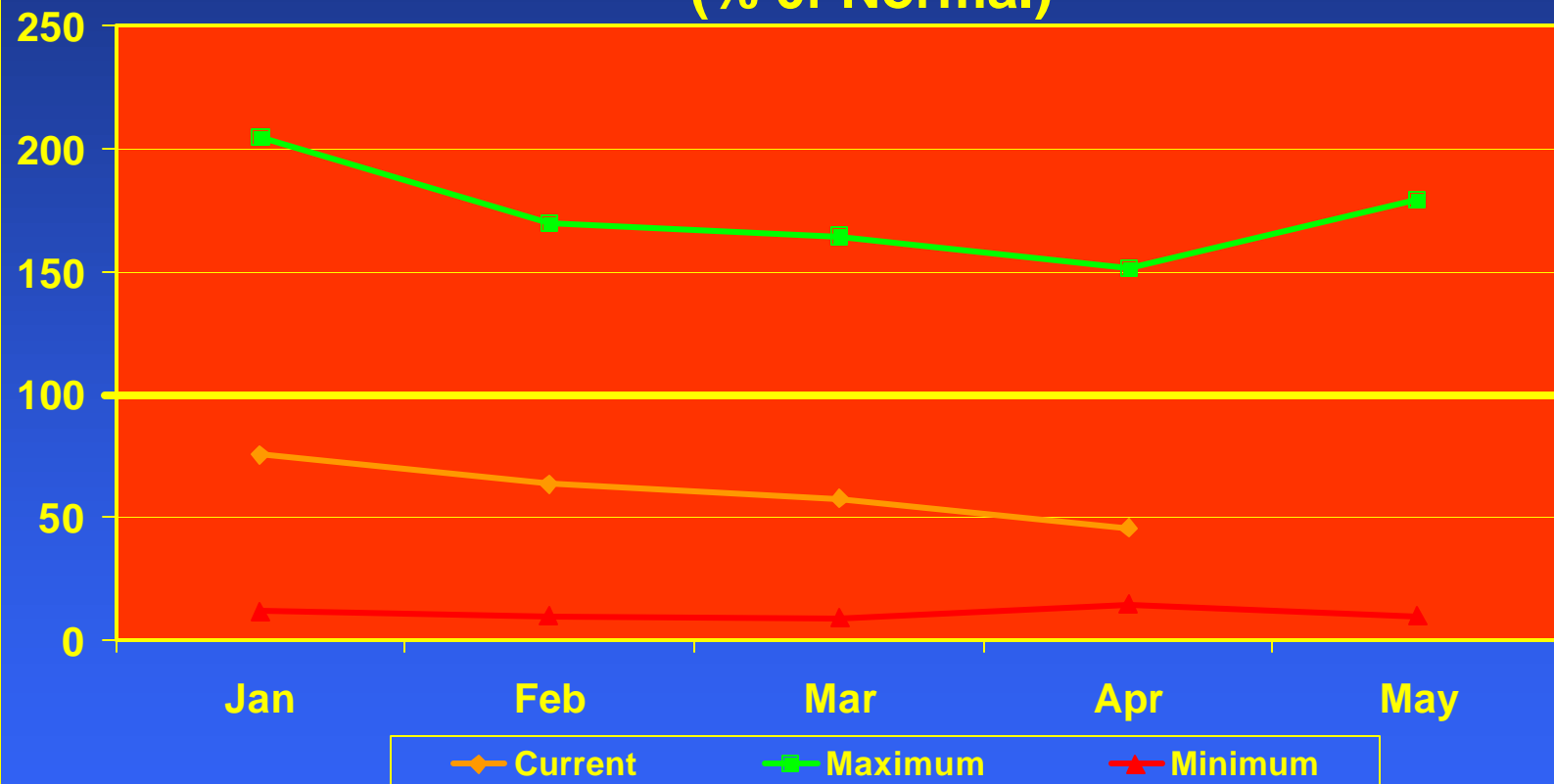
**NRCS/NWS Reported Precipitation  
(% Of Normal)**



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# ***Current Hydrologic Conditions***

**NRCS/NWS Reported Snowpack  
(% Of Normal)**



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# ***Current Hydrologic Conditions***

## ***Unreg. Flows - Accum. Vol. (Percent of Avg.)***

***As Of: 31 Mar 2001***

<b><i>LOCATION</i></b>	<b><i>OCT</i></b>	<b><i>NOV</i></b>	<b><i>DEC</i></b>	<b><i>JAN</i></b>	<b><i>FEB</i></b>	<b><i>MAR</i></b>
<b>McKenzie River @ Vida</b>	<b>87.7</b>	<b>59.8</b>	<b>53.9</b>	<b>49.8</b>	<b>48.0</b>	<b>51.4</b>
<b>N. Santiam @ Mehama</b>	<b>93.4</b>	<b>51.3</b>	<b>50.0</b>	<b>45.8</b>	<b>44.2</b>	<b>47.5</b>
<b>S. Santiam @ Waterloo</b>	<b>49.3</b>	<b>27.8</b>	<b>36.5</b>	<b>34.1</b>	<b>33.3</b>	<b>37.6</b>
<b>Willamette @ Salem</b>	<b>60.0</b>	<b>30.0</b>	<b>32.0</b>	<b>29.0</b>	<b>29.0</b>	<b>33.0</b>



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# ***April Water Supply Forecast***

***Reservoir Forecast Points - NRCS/NWS As of: 1 April 2001***

Forecast Point Forecast Period	Drier Conditions		Less Dry Cond.		30 yr Avg (1000 af)
	1000 af	% Avg	1000 af	% Avg	
<b>DETROIT LAKE INFLOW</b>					
<b>APR-SEP</b>	<b>412</b>	<b>67%</b>	<b>458</b>	<b>74%</b>	<b>619</b>
<b>GREEN PETER INFLOW</b>					
<b>APR-SEP</b>	<b>223</b>	<b>63%</b>	<b>268</b>	<b>76%</b>	<b>352</b>
<b>FOSTER LAKE INFLOW</b>					
<b>APR-SEP</b>	<b>322</b>	<b>62%</b>	<b>392</b>	<b>75%</b>	<b>522</b>

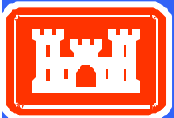


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<b>GREEN PETER INFLOW</b>					
<b>APR-SEP</b>	<b>223</b>	<b>63%</b>	<b>268</b>	<b>76%</b>	<b>352</b>
<b>DETROIT LAKE INFLOW</b>					
<b>APR-SEP</b>	<b>412</b>	<b>67%</b>	<b>458</b>	<b>74%</b>	<b>619</b>



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# ***April Water Supply Forecast***

***Reservoir Forecast Points - NRCS/NWS As of: 1 April 2001***

Forecast Point Forecast Period	Drier Conditions		Less Dry Cond.		30 yr Avg (1000 af)
	1000 af	% Avg	1000 af	% Avg	
<b>FERN RIDGE INFLOW</b>					
<b>APR-SEP</b>	<b>13</b>	<b>35%</b>	<b>26</b>	<b>70%</b>	<b>37</b>
<b>HILLS CREEK INFLOW</b>					
<b>APR-SEP</b>	<b>79</b>	<b>59%</b>	<b>96</b>	<b>72%</b>	<b>134</b>
<b>LOOKOUT POINT INFLOW</b>					
<b>APR-SEP</b>	<b>517</b>	<b>66%</b>	<b>591</b>	<b>75%</b>	<b>788</b>



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# ***April Water Supply Forecast***




***Reservoir Forecast Points - NRCS/NWS As of: 1 April 2001***

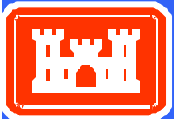
Forecast Point Forecast Period	Drier Conditions		Less Dry Cond.		30 yr Avg (1000 af)
	1000 af	% Avg	1000 af	% Avg	
<b>COUGAR LAKE INFLOW</b>					
<b>APR-SEP</b>	<b>147</b>	<b>65%</b>	<b>165</b>	<b>73%</b>	<b>227</b>
<b>BLUE RIVER INFLOW</b>					
<b>APR-SEP</b>	<b>51</b>	<b>59%</b>	<b>62</b>	<b>72%</b>	<b>86</b>
<b>DORENA LAKE INFLOW</b>					
<b>APR-SEP</b>	<b>70</b>	<b>55%</b>	<b>94</b>	<b>74%</b>	<b>127</b>
<b>COTT. GROVE INFLOW</b>					
<b>APR-SEP</b>	<b>20</b>	<b>50%</b>	<b>29</b>	<b>74%</b>	<b>39</b>



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# ***Forecast Analysis***

-  Uses a Hydrologic Model of the Willamette Projects & the April NRCS/NWS Water Supply Forecast*
-  Simulates the Operation of the 13 Willamette Projects for Period of Record (59 Years)*
-  Operational Criteria Previously Discussed*



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## WILLAMETTE RIVER AT SALEM April Forecast Summary Hydrograph



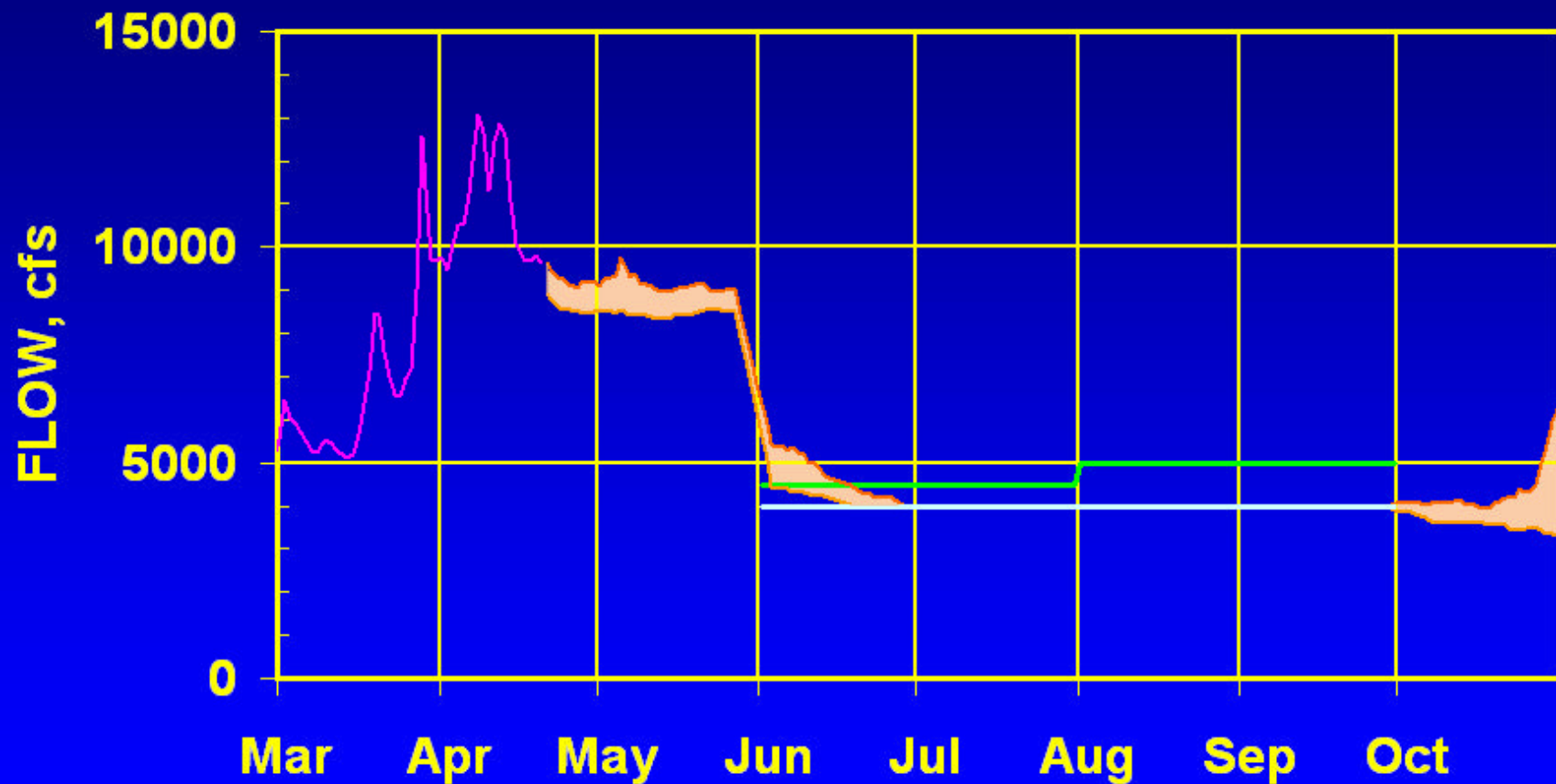
AS OF: 04/23/01

POR 1936-1994



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## WILLAMETTE RIVER AT ALBANY April Forecast Summary Hydrograph



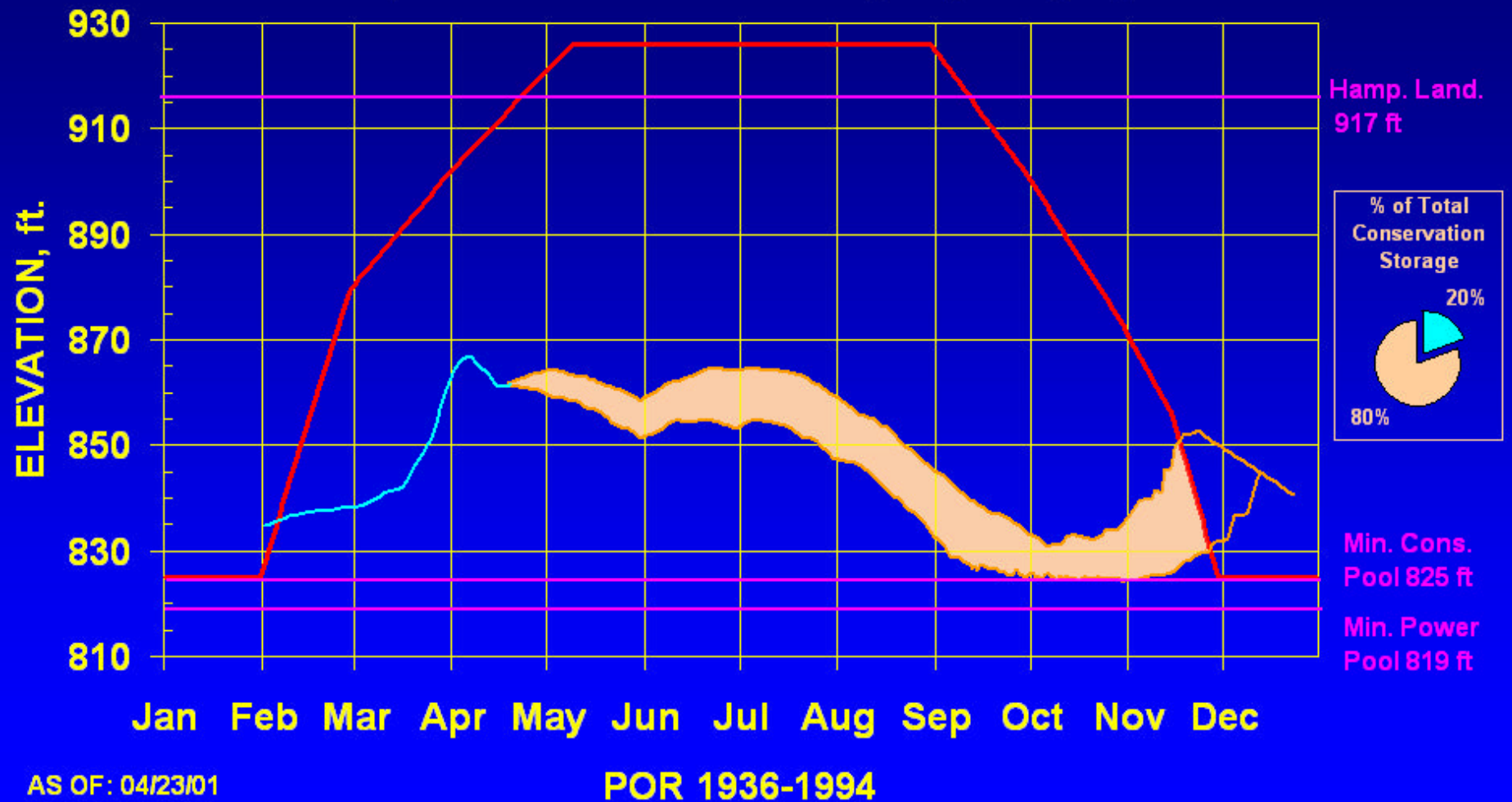
AS OF: 04/23/01

POR 1936-1994



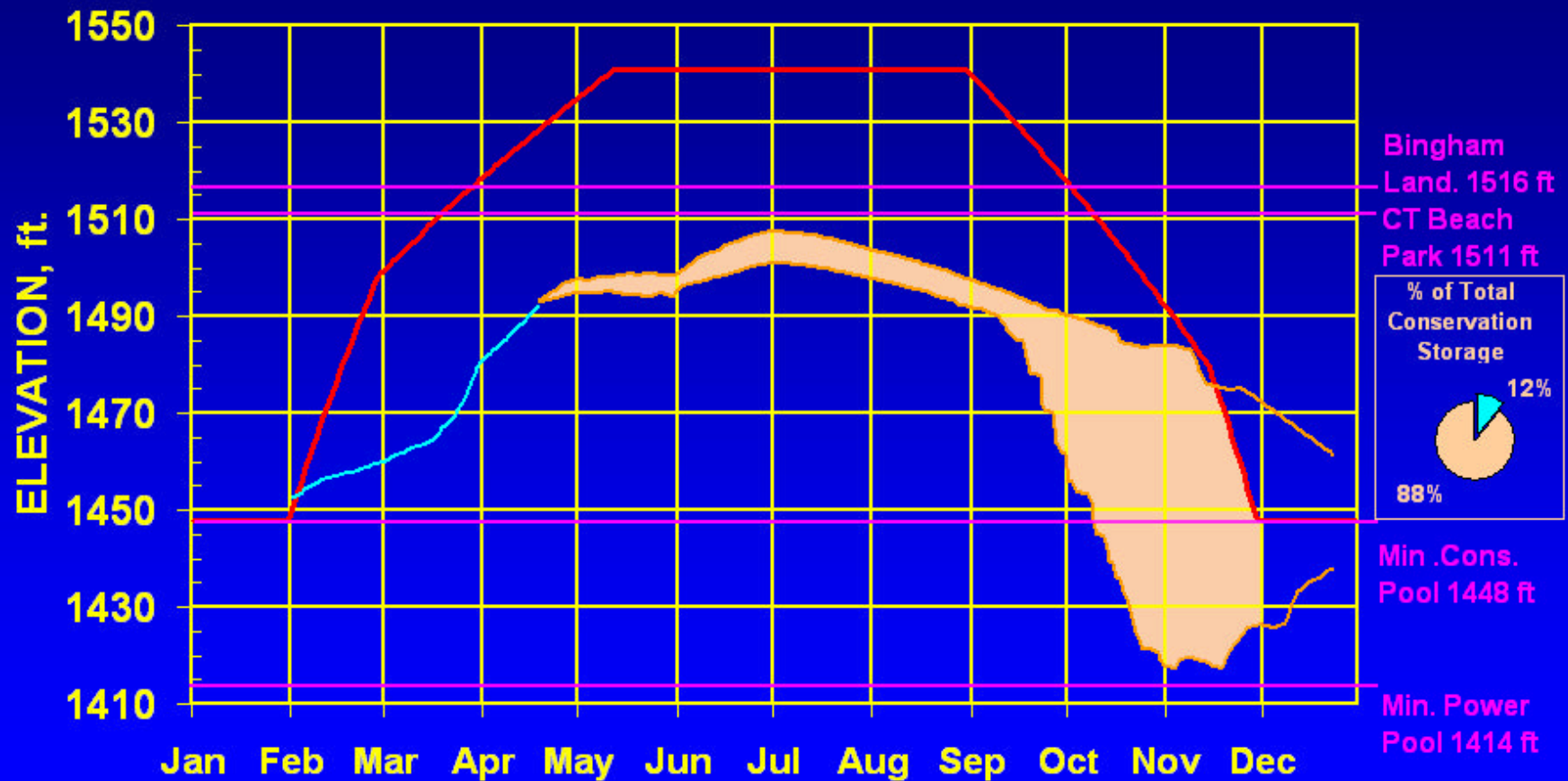
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# LOOKOUT POINT Lake Elevation April Forecast Summary Hydrograph



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# HILLS CREEK Lake Elevation April Forecast Summary Hydrograph



**POR 1936-1994**

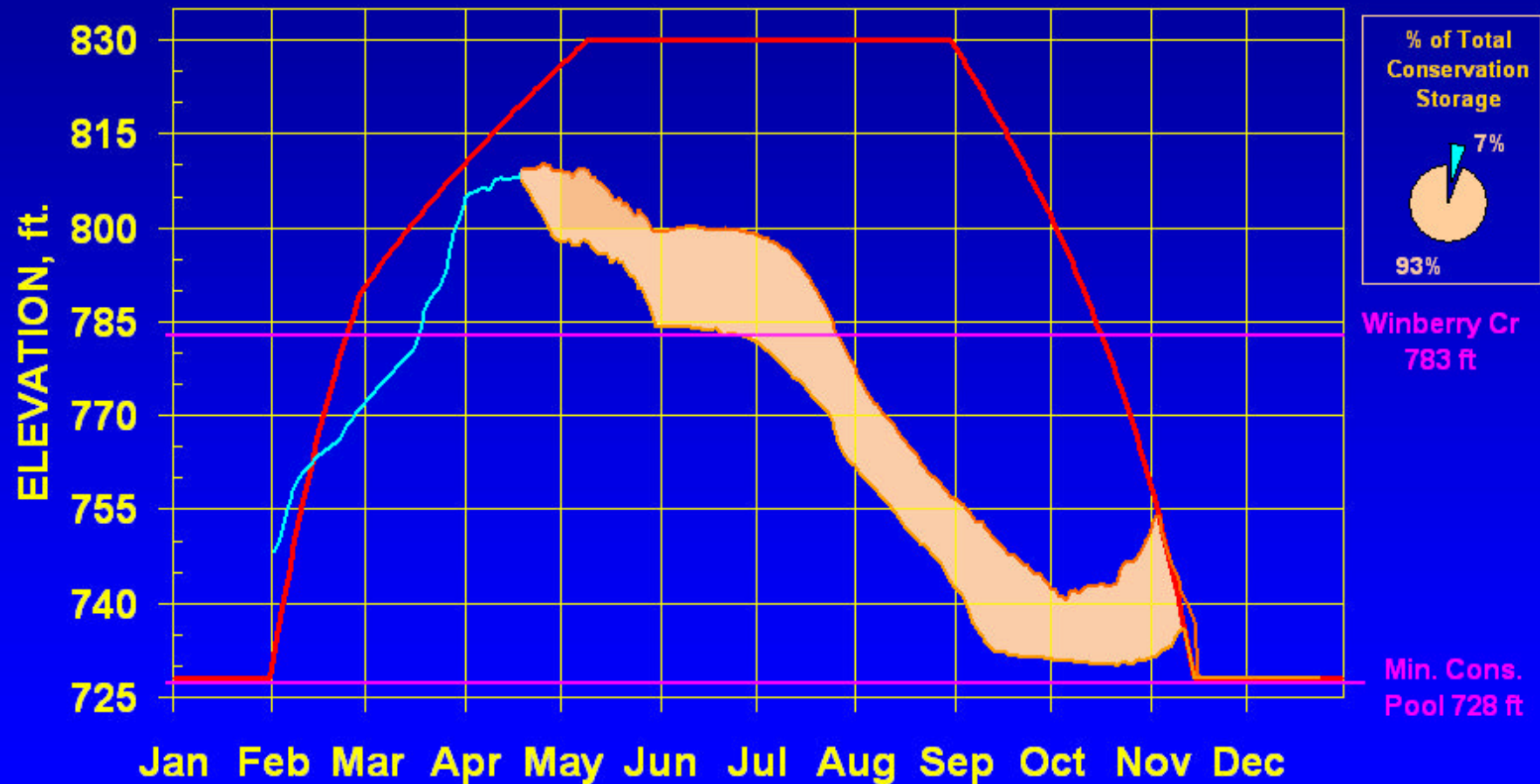
AS OF: 04/23/01



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## FALL CREEK Lake Elevation April Forecast Summary Hydrograph



AS OF: 04/23/01

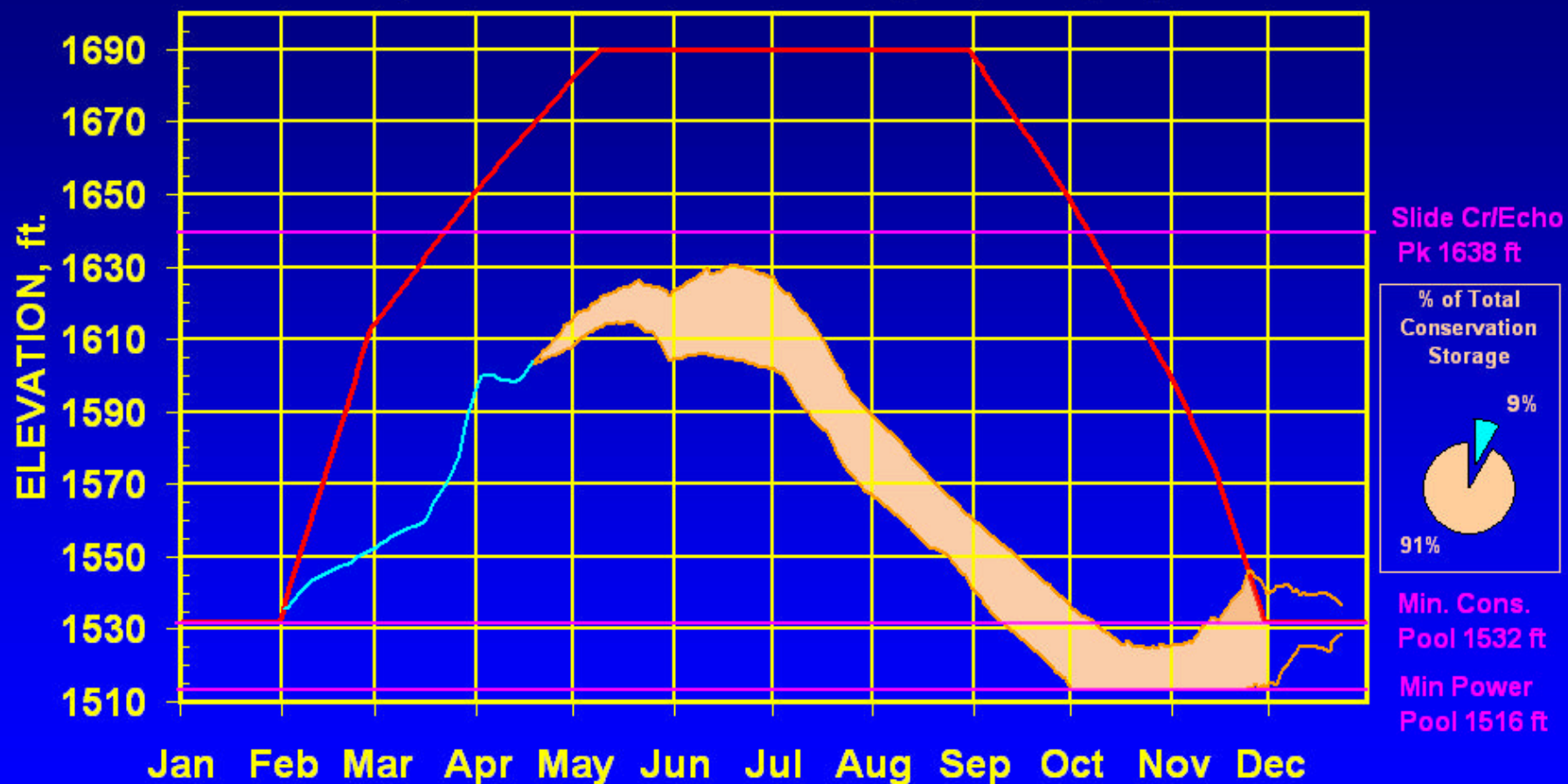
POR 1936-1994



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## COUGAR Lake Elevation April Forecast Summary Hydrograph

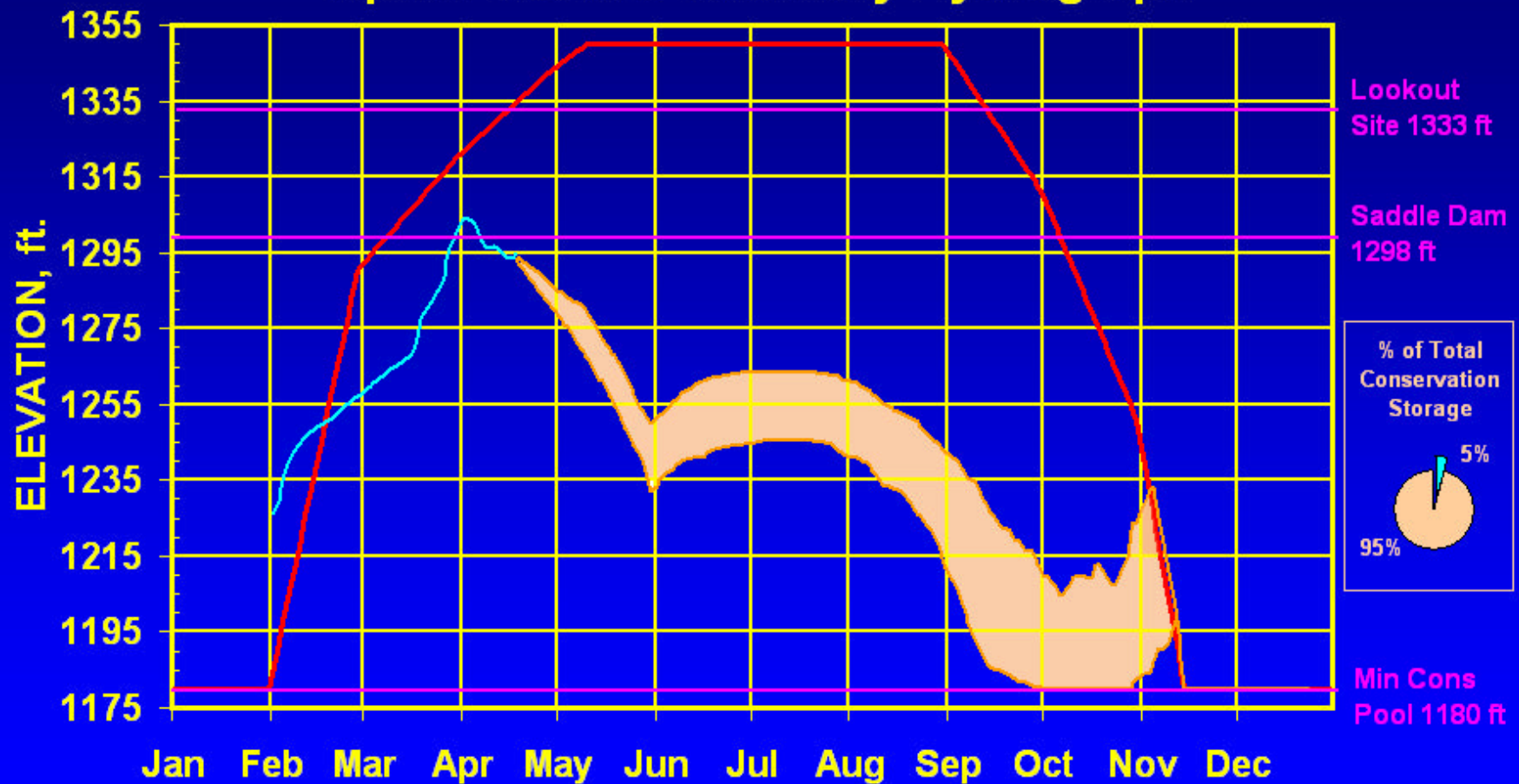


AS OF: 04/23/01



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## BLUE RIVER Lake Elevation April Forecast Summary Hydrograph



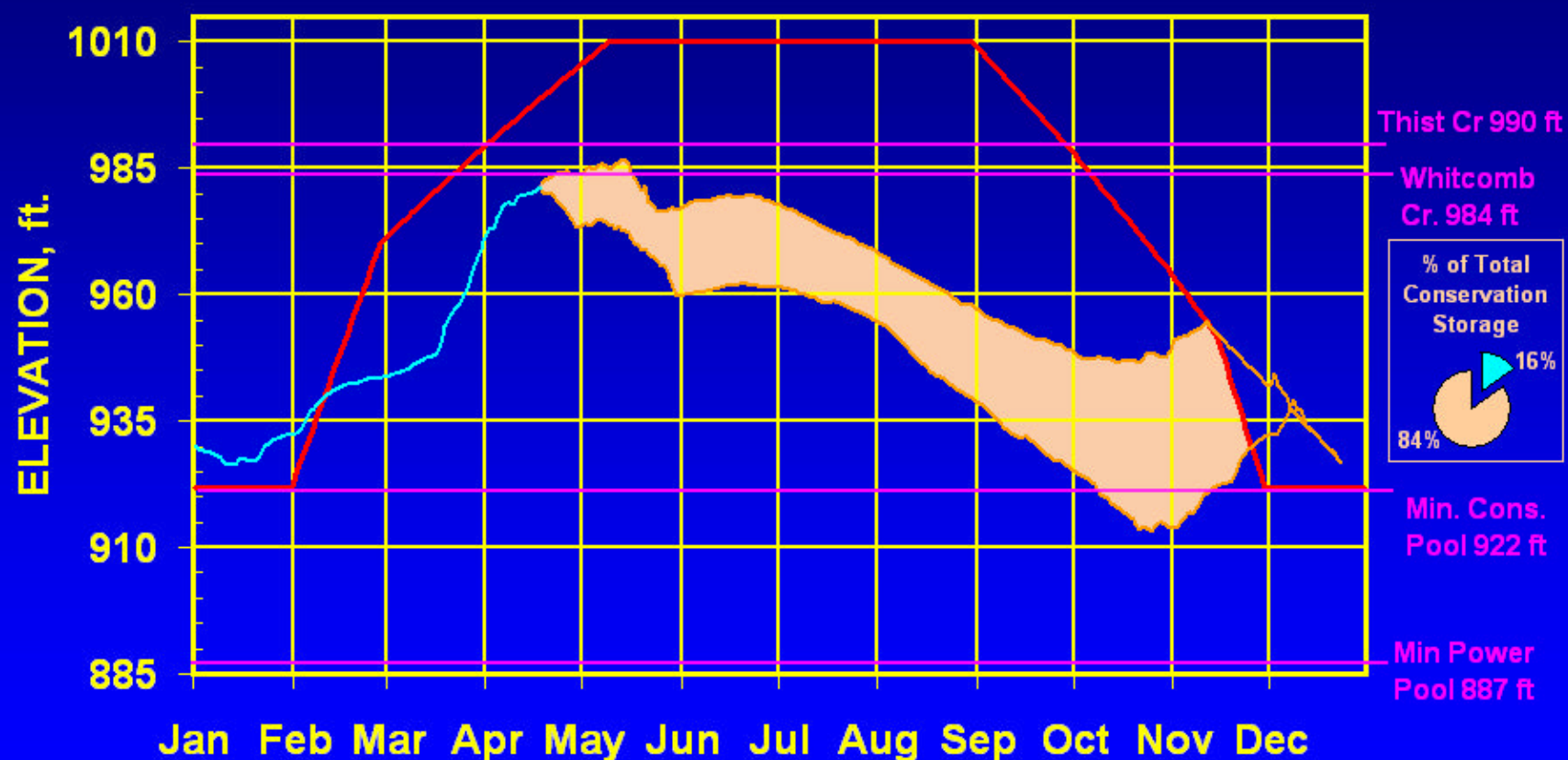
AS OF: 04/23/01

POR 1936-1994



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# GREEN PETER Lake Elevation April Forecast Summary Hydrograph



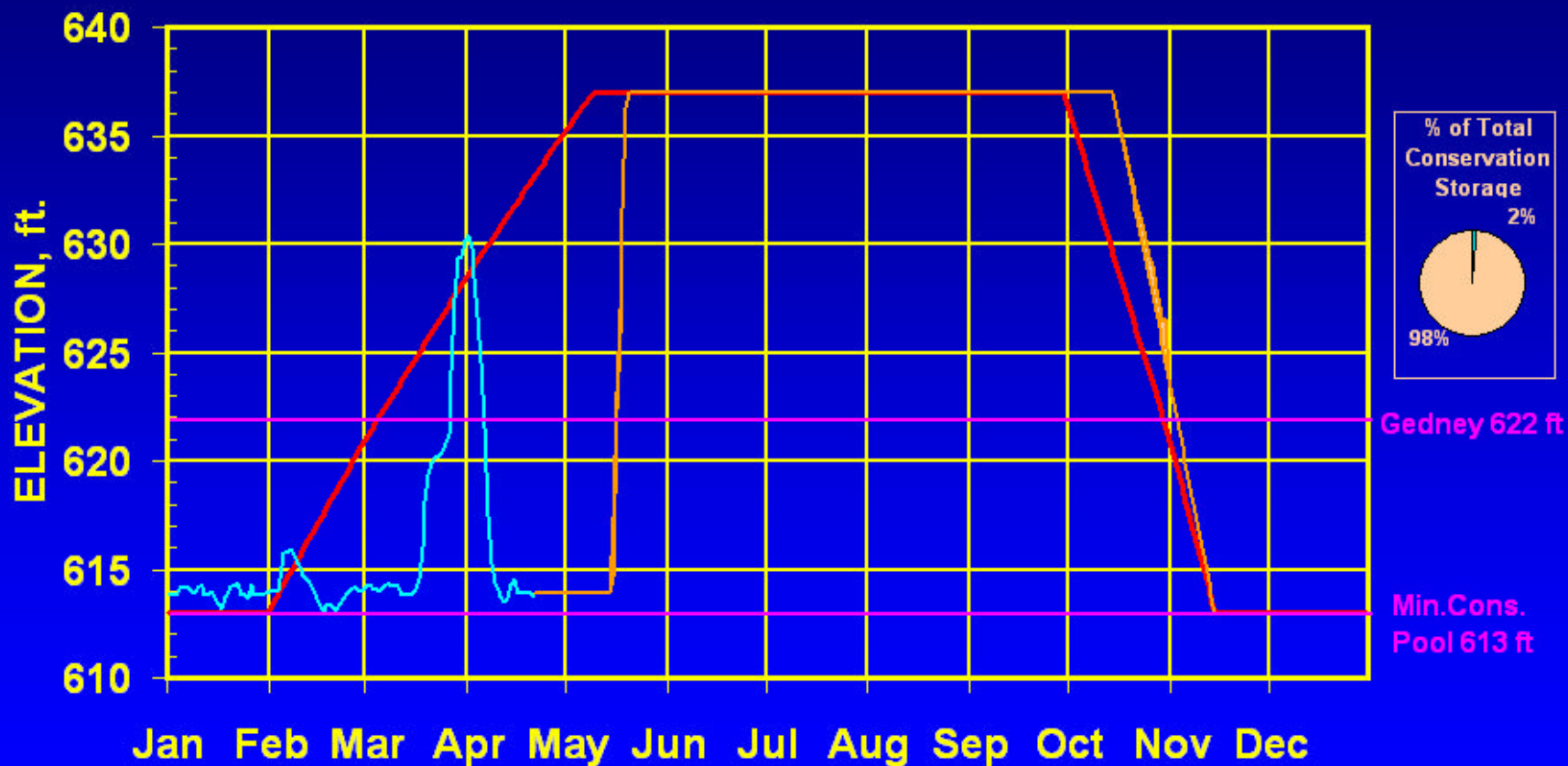
AS OF: 04/23/01

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## FOSTER Lake Elevation April Forecast Summary Hydrograph



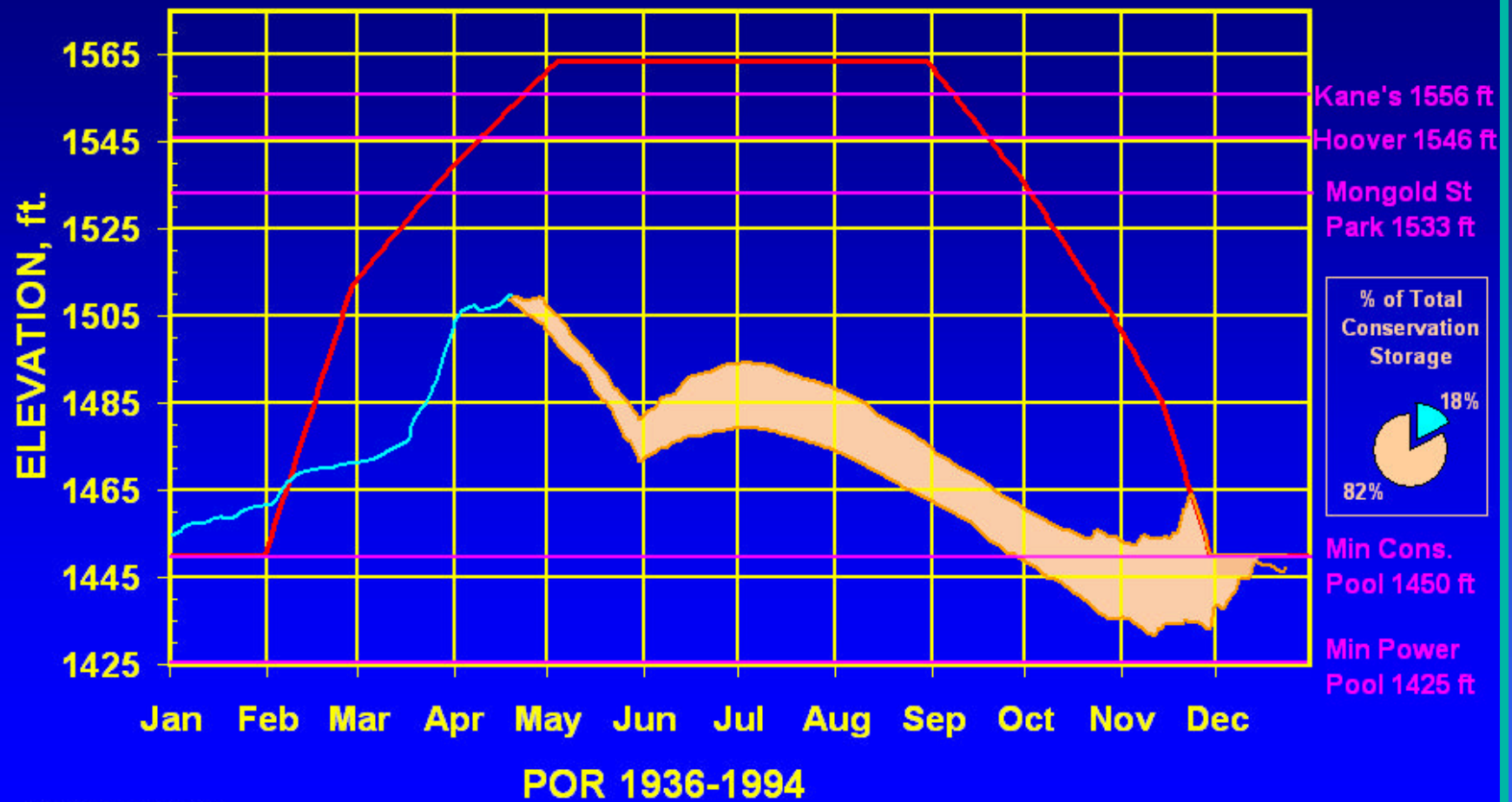
AS OF: 04/23/01

POR 1936-1994



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## DETROIT Lake Elevation April Forecast Summary Hydrograph



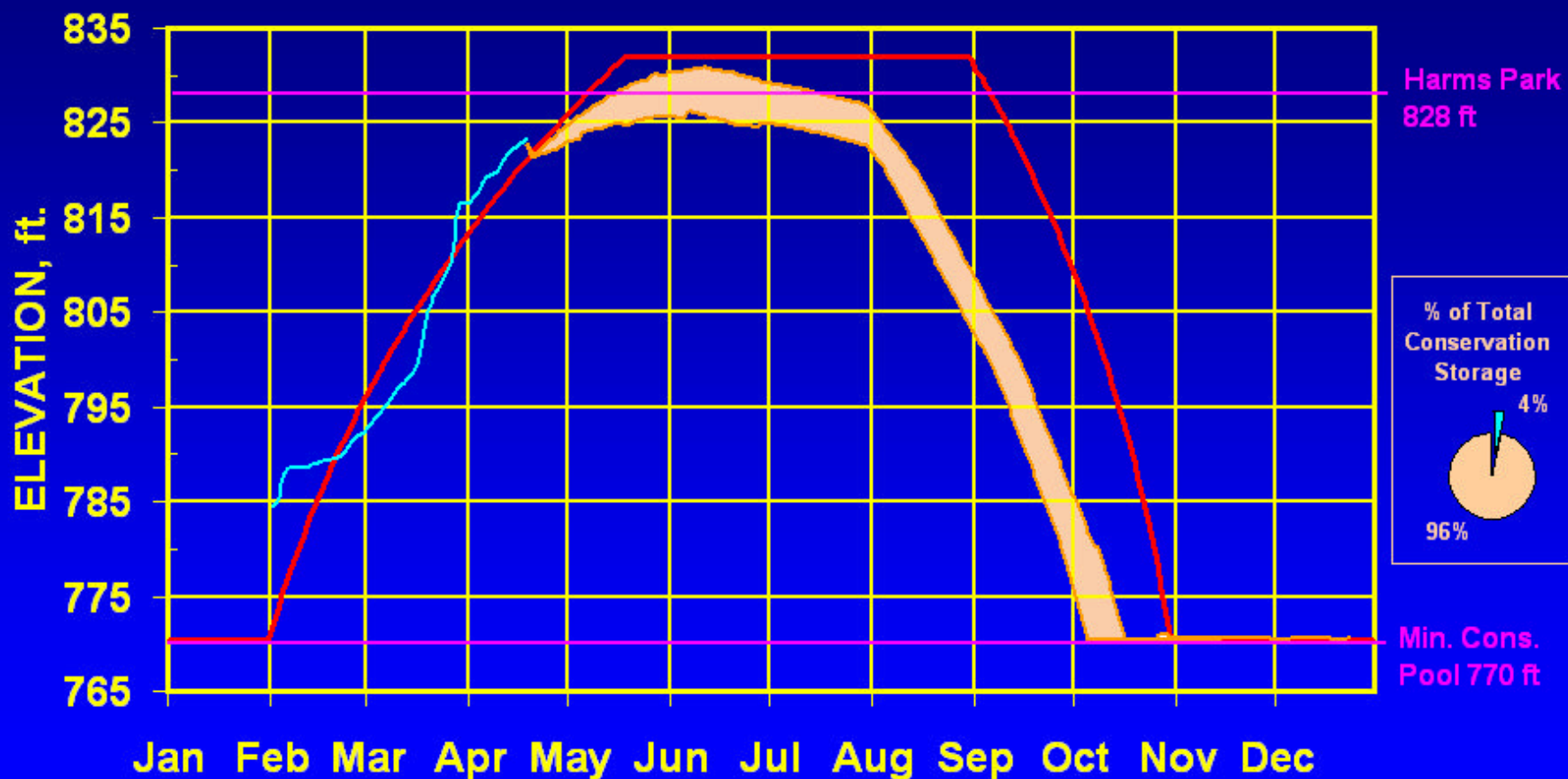
AS OF: 04/23/01



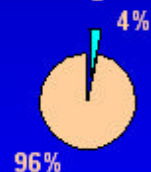
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# DORENA Lake Elevation April Forecast Summary Hydrograph



% of Total  
Conservation  
Storage



Min. Cons.  
Pool 770 ft

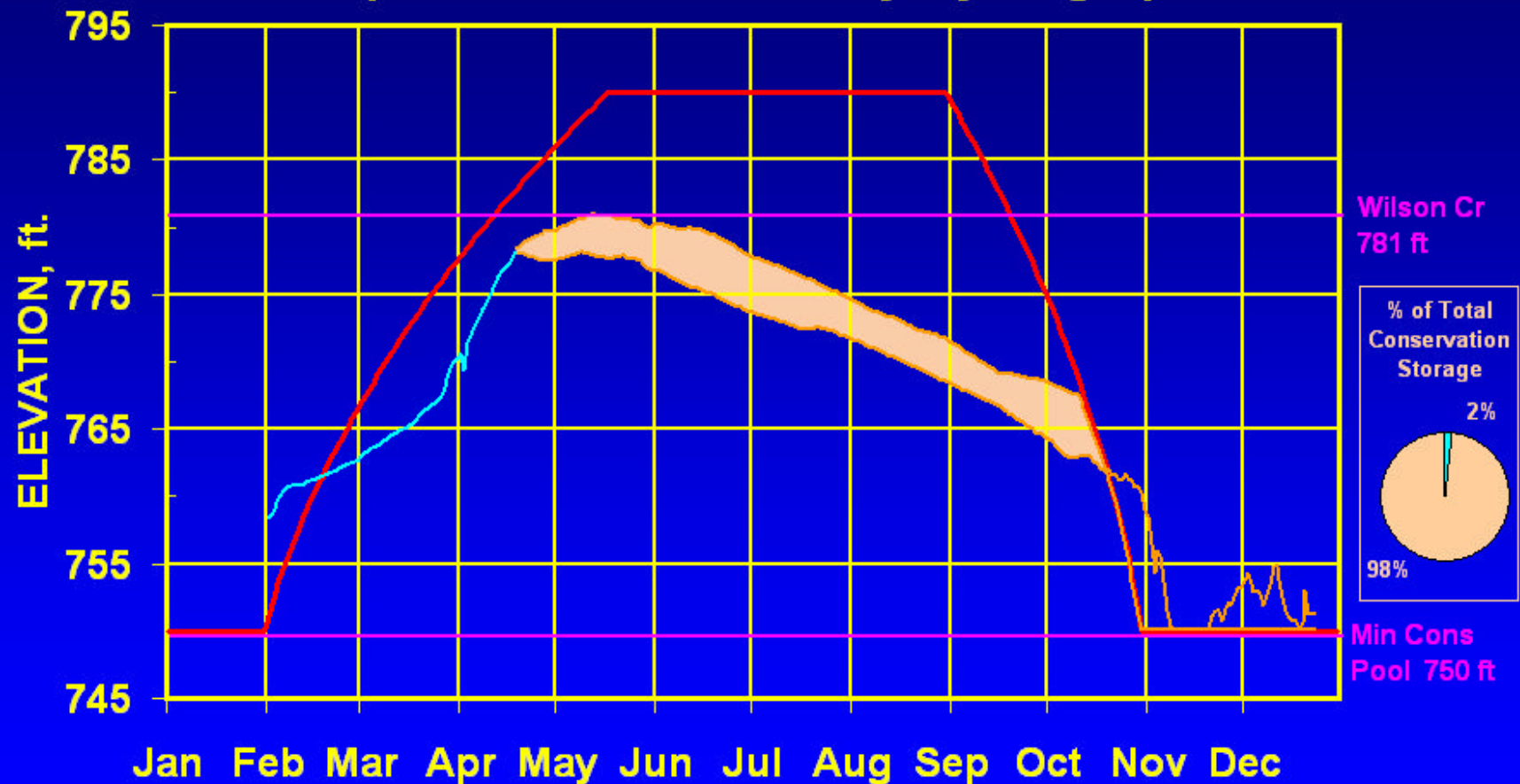
AS OF: 04/23/01

POR 1936-1994



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## COTTAGE GROVE Lake Elevation April Forecast Summary Hydrograph



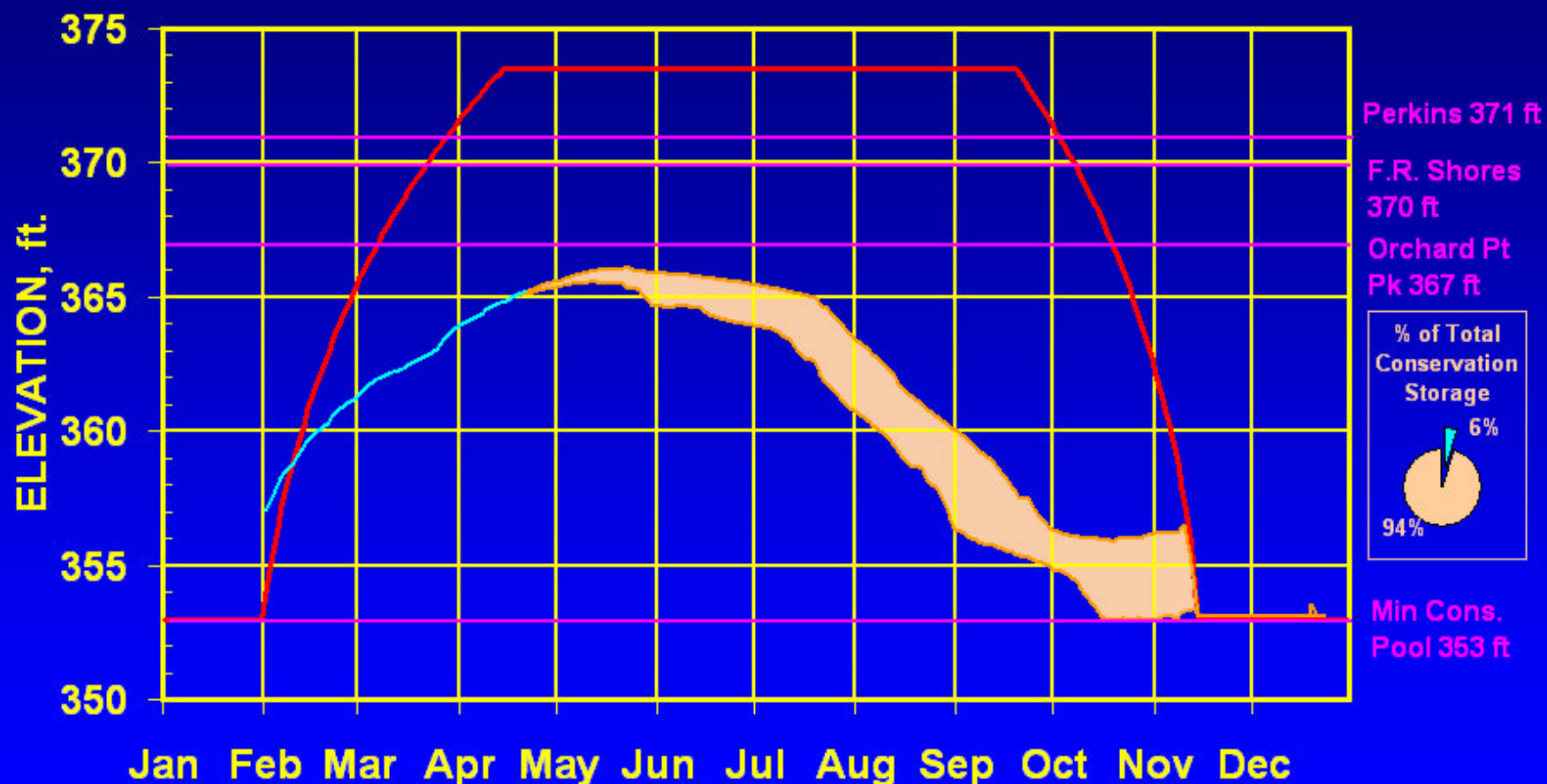
AS OF: 04/23/01

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# FERN RIDGE Lake Elevation April Forecast Summary Hydrograph



AS OF: 04/23/01

POR 1936-1994



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